

Draft
MDAQMD
2004 Ozone Attainment Plan
(State and Federal)

February 2004

Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392-2310

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Abbreviations and Acronyms

AQAP	Air Quality Attainment Plan
AQMA	Air Quality Management Area
AQMP	Air Quality Management Plan
CAAQS	California Ambient Air Quality Standard
CARB	California Air Resources Board
CCAA	California Clean Air Act
FCAA	Federal Clean Air Act
FONA	Federal Ozone Non-attainment Area
MDAQMD	Mojave Desert Air Quality Management District
NAAQS	National Ambient Air Quality Standard
NO _x	Oxides of Nitrogen
O ₃	Ozone
ROG	Reactive Organic Gases
SBCAPCD	San Bernardino County Air Pollution Control District
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
UAM	Urban Airshed Model
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

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Executive Summary

The United States Environmental Protection Agency (USEPA) designated the Southeast Desert Modified Air Quality Management Area (Southeast Desert Modified AQMA) as non-attainment for ozone National Ambient Air Quality Standards (NAAQS) pursuant to the provisions of the Federal Clean Air Act (FCAA). A portion of the Mojave Desert Air Quality Management District (MDAQMD) is included in the Southeast Desert Modified AQMA. The California Air Resources Board has also designated the entire Mojave Desert Air Basin (MDAB) non-attainment for ozone California Ambient Air Quality Standards (CAAQS) pursuant to the provisions of the California Clean Air Act (CCAA). The entire MDAQMD is located within the MDAB. The MDAQMD has adopted State and Federal attainment plans for the region within its jurisdiction. The most recent such plan that was approved by USEPA is the Attainment Demonstration Plan adopted in 1994. The most recently adopted State plan is the 1996 Triennial Revision to the 1991 Air Quality Attainment Plan.

The MDAQMD has reviewed and updated all elements of the ozone plan. The portion of the MDAQMD designated as a Federal ozone non-attainment area will be in attainment of the NAAQS for ozone by the required year, 2007. The entire MDAQMD will show significant progress towards attainment of the ozone CAAQS by that year.

This document includes the latest planning assumptions regarding population, vehicle activity and industrial activity. This document addresses all existing and forecast ozone precursor-producing activities within the MDAQMD through the year 2007. This document includes all necessary information to allow general and transportation conformity findings to be made within the MDAQMD.

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CHAPTER 1 - Introduction and Background

Purpose

Regulatory History

Statement of Issues

Federal Legal Requirements

State Legal Requirements

Pollutant Descriptions

Health Effects

Setting

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INTRODUCTION

Purpose

The Southeast Desert Modified AQMA (as defined in 40 CFR 81.167) has been designated non-attainment for the NAAQS for ozone by USEPA (40 CFR 81.305) and the MDAB (formerly known as the Southeast Desert Air Basin) has been designated non-attainment for the CAAQS for ozone by CARB (17 Cal. Code Reg. §60201). The MDAQMD is located within entirely within the MDAB and partially within the Southeast Desert Modified AQMA. The MDAQMD has experienced ambient ozone concentrations in excess of the one-hour ozone NAAQS and the ozone CAAQS. This document: (1) demonstrates that the MDAQMD will meet the primary required Federal ozone planning milestones, attainment of the ozone NAAQS by the end of 2007; (2) presents the progress the MDAQMD will make towards meeting all required State ozone planning milestones, including attainment of the ozone CAAQS; and (3) discusses the 8 hour ozone NAAQS, preparatory to an expected non-attainment designation for the new NAAQS. This document satisfies 42 U.S.C. §§7410, 7502, 7504 and 7511a (FCAA §§110, 172, 174, and 182) regarding implementation plans, non-attainment plan provisions, planning procedures, and ozone plan submissions and requirements for the one-hour NAAQS. This document also satisfies or addresses Health & Safety Code (H&SC) §§40911, 40912, 40913, 40914, 40915, 40918, 40924, and 40925 regarding ozone attainment plans and plan elements.

BACKGROUND

Regulatory History

The USEPA designated a portion of the southwestern desert part of San Bernardino County as non-attainment and classified it as Severe-17 for ozone as part of the Southeast Desert Modified AQMA. This large “maintenance area” was classified based on a 0.24 ppm ozone design value calculated from pre-1990 concentrations in Banning. The Severe-17 classification requires attainment of the one-hour ozone NAAQS by the end of 2007, 17 years after the adoption of the FCAA Amendments in 1990.

The entire MDAB has been designated by CARB as non-attainment of the ozone CAAQS. The entire MDAQMD is located within the MDAB. CARB has classified the MDAQMD as a “moderate” ozone non-attainment area.

The MDAQMD was established on July 1, 1993, pursuant to H&SC §41200 et seq (Statutes 1992 ch. 642). The MDAQMD was a successor agency to the San Bernardino County Air Pollution Control District (SBCAPCD), which had jurisdiction over the desert portions of San Bernardino County commencing in February 1977 through the formation of the MDAQMD. The Palo Verde Valley portion of eastern Riverside County was annexed by the MDAQMD from the South Coast Air Quality Management District (SCAQMD) effective July 1, 1994, pursuant to provisions of H&SC 41210(c) and MDAQMD Resolution 94-03.

Initial air quality planning for the region was the 1991 Air Quality Attainment Plan (AQAP) which was adopted by the SBCAPCD on August 26, 1991 in response to the State of California

ozone planning requirements. Additional ozone plans were adopted by the MDAQMD to address Federal ozone planning requirements. This document replaces or updates all previously submitted plans.

Regional Ozone Planning Chronology

1989 - CARB designates SEDAB (now known as MDAB) as non-attainment for ozone CAAQS
1990 - CARB classifies the SEDAB (now known as MDAB) as moderate ozone non-attainment
November, 1990 - Adoption of Federal Clean Air Act Amendments
August 26, 1991 - Adoption of the 1991 Air Quality Attainment Plan (State) by SBCAPCD
July 1, 1993 - Formation of Mojave Desert Air Quality Management District
July 1, 1994 - Annexation of Palo Verde Valley portion of Riverside County
March 24, 1994 – Adoption of Rate-Of-Progress Plan (Federal) by MDAQMD
October 26, 1994 - Adoption of Attainment Demonstration Plan (Federal) by MDAQMD
January 22, 1996 - Adoption of Triennial Revision to 1991 AQAP (State) by MDAQMD

Statement of Issues

The MDAQMD is downwind of the Los Angeles basin, and to a lesser extent, is downwind of the San Joaquin Valley. Prevailing winds transport ozone and ozone precursors from both regions into and through the MDAB during the summer ozone season. These transport couplings have been officially recognized by CARB.¹ Local MDAQMD emissions contribute to exceedances of both the NAAQS and CAAQS for ozone, but the MDAB would be in attainment of both standards without the influence of this transported air pollution from upwind regions.

Federal Legal Requirements

The MDAQMD must adopt a plan that provides for the implementation, maintenance and enforcement of the NAAQS within three years after promulgation of the NAAQS. The plan is to include enforceable emission limitations, provide for a monitoring program, provide for a permit program (including a new source review program), contingency measures, and air quality modeling (42 U.S.C. §7410(a); FCAA §110(a)). The MDAQMD met this requirement with the 1994 Rate-Of-Progress and Attainment Demonstration plans. This document represents an update to those plans. The MDAQMD has adopted enforceable emission limitations, has a monitoring system in place throughout the populated portions of the Federal Ozone Non-Attainment Area (FONA), maintains a permit program (including a New Source Review program with an ambient air quality modeling requirement), and has performed an attainment demonstration using air quality modeling. This document identifies a contingency measure.

This document incorporates all reasonably available control measures (all such measures have already been adopted for the FONA). This document includes a comprehensive, accurate and

¹ “Ozone Transport: 2001 Review,” April 2001, CARB identifies the South Coast Air Basin as having an overwhelming and significant impact on the Mojave Desert Air Basin (which includes the Mojave Desert) and the San Joaquin Valley as having an overwhelming impact on the MDAB.

current inventory of actual emissions (42 U.S.C. §7502(c)(3), 7511a(a)(1); FCAA §§172(c)(3), 182(a)(1)).

This document discusses reasonable further progress (42 U.S.C. §§7502(c)(2), 7511a(b)(1); FCAA §§172(c)(2), 182(b)(1)) for the applicable periodic milestone dates (2002, 2005 and 2007) (42 U.S.C. §7511a(g); FCAA §182(g)). The FONA is not capable of meeting the reasonable further progress milestones on its own; the target levels would require reductions in source categories that are not under the jurisdiction of the MDAQMD (specifically mobile sources).

This document has been coordinated with the transportation planning process (42 U.S.C. §7504; FCAA §174). The document includes an on-road mobile source emission budget for the FONA, and also includes the on-road mobile source emission budget for the entire Southeast Desert Modified AQMA as an appendix.

This document updates the MDAQMD emissions inventory (42 U.S.C. 7511a(a)(1); FCAA §182(a)(1)). The MDAQMD met the original inventory requirement with the 1994 Rate-Of-Progress and Attainment Demonstration plans.

The MDAQMD has an enhanced non-attainment pollutant monitoring program, requires reasonably available control technology within the FONA, has a vehicle inspection and maintenance program, a De Minimis rule, and a gasoline vapor recovery rule. The District participates in the State's Clean-Fuel Vehicle Program, and performs periodic transportation activity consistency demonstrations in conjunction with the Southern California Association of Governments (including a review of vehicle miles traveled growth). The MDAQMD controls oxides of nitrogen (NO_x) in addition to Volatile Organic Compounds (VOC) within the FONA, and is addressing both pollutants in this document. The MDAQMD new source review program defines sources emitting 25 tons per year or more as major and requires offsets at a 1.3 to 1 ratio (42 U.S.C. §§7511a(d), 7511a(d)(2); FCAA §§182(d) 182(d)(2)). Employer trip rules (42 U.S.C. §7511a(d)(1); FCAA §182(d)(1)) have been shown to be not cost-effective for the FONA due to low population density.

State Legal Requirements

H&SC §40911 requires each district that is a receptor of transported air pollutants to prepare and submit a plan to CARB not later than June 30, 1991. The SBCAPCD, the predecessor agency to the MDAQMD, met this requirement for the MDAB with the 1991 Air Quality Attainment Plan. The MDAQMD updated this plan in 1996. This document is a revision to both the initial plan and the 1996 update.

H&SC §40912 requires a downwind district plan to contain sufficient measures to reduce emissions originating in the district below the level at which violations of the CAAQS would occur in the absence of transported contribution. This document addresses this requirement to the extent possible.

This document achieves and maintains the CAAQS by the earliest possible date considering concentrations, violations, transport, emission projections, emission inventories, control measures, emission reductions, military base closures, and cost effectiveness (H&SC §40913).

H&SC §40914 requires specific annual ozone precursor emission reductions relative to 1990 (five percent per year or as otherwise approved), and the adoption of all feasible measures. This document addresses this requirement, but it is not feasible to achieve the reduction specified without reducing sources not under the jurisdiction of the MDAQMD. The MDAQMD has adopted and will adopt all feasible control measures.

H&SC §40915 requires that the plan include contingency measures for use in case of inadequate progress towards attainment. The MDAQMD has identified a contingency measure.

The MDAQMD has a New Source Review program, has implemented Reasonably Available Control Technology on all sources, has an emissions inventory system, and has a public education program (H&SC §40918). Reasonably available transportation control measures, area-wide and indirect source control programs have been shown not to be cost-effective within the MDAQMD due to insufficient population density.

This document includes the required assessment of progress towards attainment of the CAAQS, addressing concentrations, emissions and control measures (H&SC §40924). This document updates previously submitted plans and summaries of progress.

This document corrects deficiencies, updates planning assumptions and addresses emissions reductions and growth since previous plan submissions (H&SC §40925). This document updates all previous plan submissions.

Pollutant Description and Health Effects

Ozone (O₃)- A colorless gas that is a highly reactive form of oxygen. It has a strong odor when highly concentrated. Ozone can occur naturally but can also be formed from other compounds through photochemistry, a complex system of reactions with hydrocarbons and oxides of nitrogen in the presence of sunlight (ultraviolet). The MDAB experiences ozone concentrations in excess of the State and Federal ambient air quality standards.

Ozone can cause respiratory irritation and discomfort, making breathing more difficult during exercise. Ozone can reduce the respiratory system's ability to remove inhaled particles, increase pulse rate, decrease blood pressure and reduce the body's ability to fight infection. After six hours of exposure a healthy person can have significant reduction of lung function. It is an irritant towards the skin, eyes, upper respiratory system, and mucous membranes, although symptoms disappear after exposure. It may also be a carcinogen.

Setting

The MDAQMD includes the desert portion of San Bernardino County and a portion of eastern Riverside County commonly known as the Palo Verde Valley. A portion of the MDAQMD has

been designated non-attainment for the one-hour ozone NAAQS by USEPA as a portion of the Southeast Desert Modified AQMA (herein referred to as the FONA), based on a 240 part per billion (ppb) ozone design value monitored at Banning, California in Riverside County (40 CFR 81.305). The Southeast Desert Modified AQMA was defined using the Los Angeles-Anaheim-Riverside Consolidated Metropolitan Statistical Area, and includes a portion of the counties of Los Angeles, Riverside and San Bernardino (40 CFR 81.167). The 240 ppb ozone design value classifies the area as a Severe-17 non-attainment area with 2007 as the required attainment year (42 U.S.C. 7511(a)(2); FCAA §181(a)(2)). The FONA includes the communities of Phelan, Hesperia, Adelanto, Victorville, Apple Valley, Barstow, Joshua Tree, Yucca Valley and Twentynine Palms (the southwestern portion of the MDAQMD).

The entire MDAQMD (including the eastern end of Riverside County, the Palo Verde Valley) has been designated non-attainment of the ozone CAAQS. CARB has classified the MDAQMD as a moderate ozone non-attainment area based on a 110 ppb ozone design value monitored at Barstow, California on April 29, 1989.

The MDAQMD covers more than 20,000 square miles and included 359,551 persons as of the 1990 census (approximately 445,000 in 2002). The region is characterized by hot, dry summers and cool winters, with little precipitation. The National Training Center at Fort Irwin, the Marine Corps Air Ground Combat Center, and portions of Edwards Air Force Base and the China Lake Naval Air Weapons Station are in the MDAQMD. The MDAQMD also includes the Mojave National Preserve and portions of Death Valley National Park and Joshua Tree National Park.

The primary roadways in the MDAQMD are Interstate 15, Interstate 40 and Interstate 395. All of these highways carry a significant amount of transiting heavy duty truck traffic, and Interstate 15 carries a substantial amount of commute traffic into the greater Los Angeles Basin.

The MDAQMD is a growing bedroom community, but does have significant mining and military activity.

Ozone Trend

The MDAQMD has experienced a substantial reduction in the number of days when ozone exceeds the one-hour ozone NAAQS, as displayed in Figure 1. The region has also experienced improvement in the number of days when ozone exceeds the ozone CAAQS, as shown in Figure 2.

Figure 1 - Federal One-Hour Ozone Exceedance Day Trend

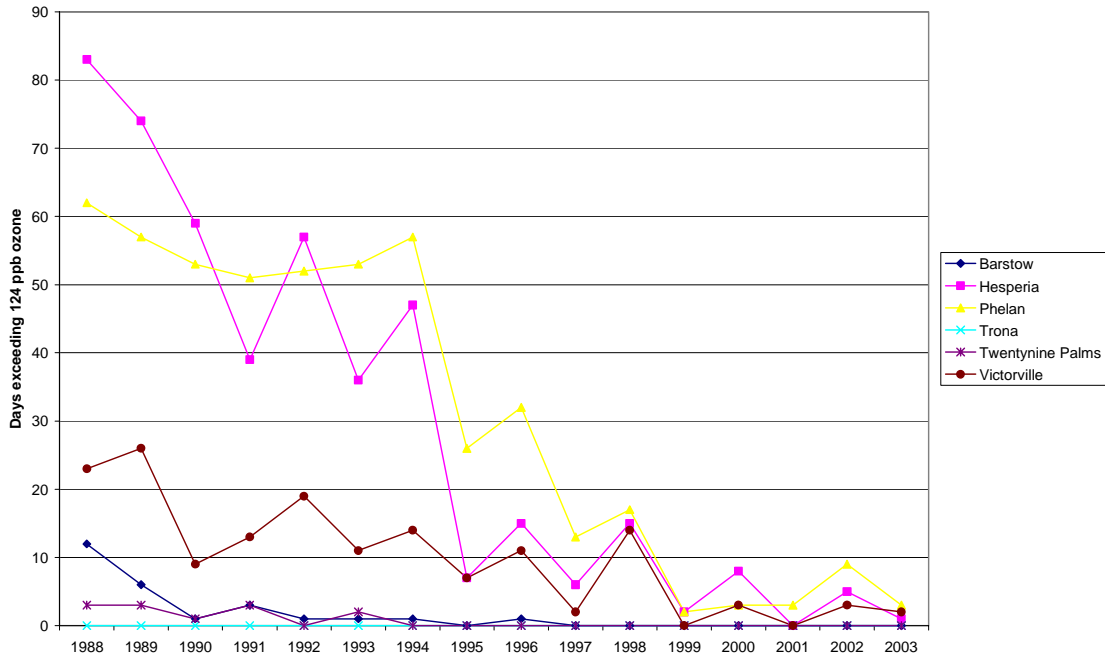
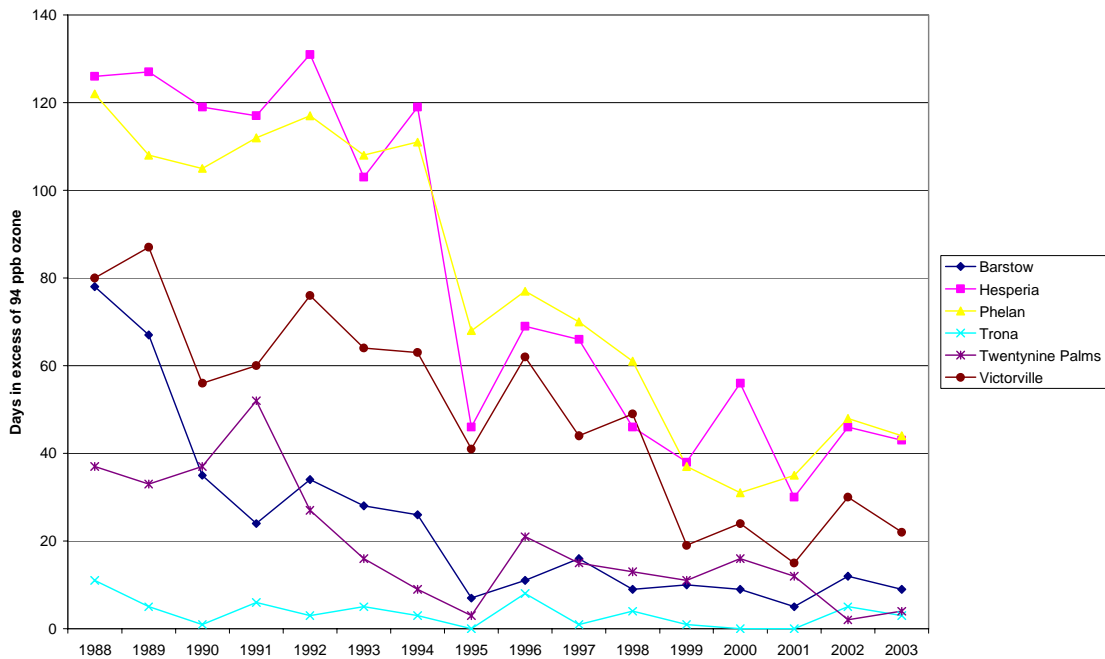
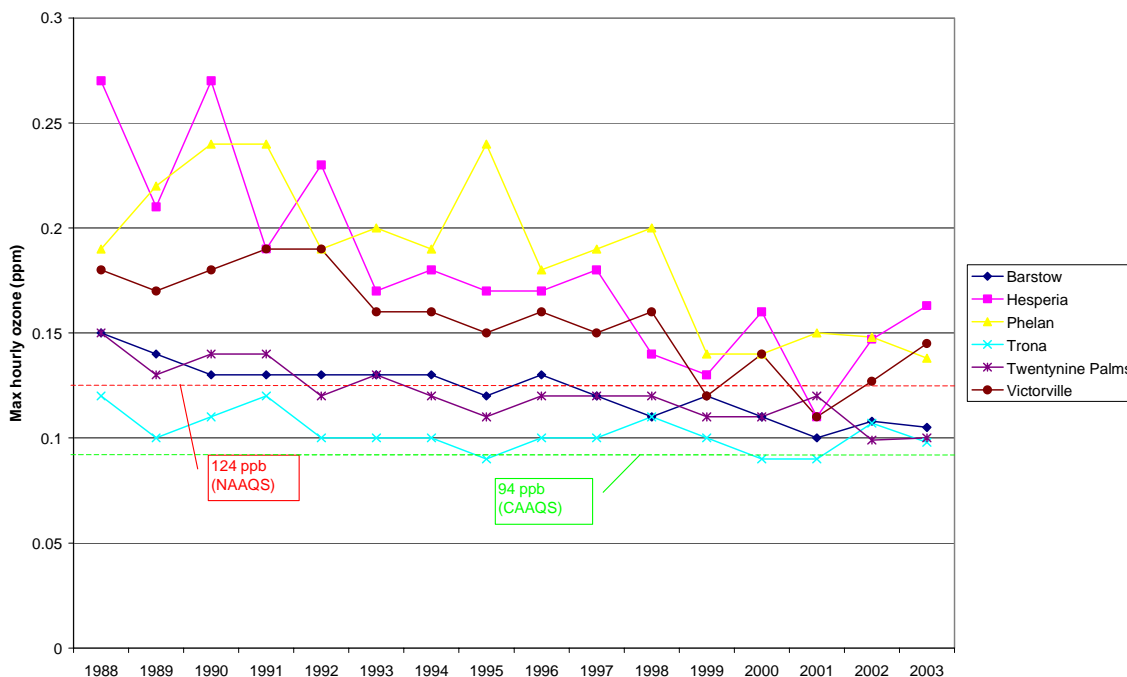


Figure 2 - State Ozone Exceedance Day Trend



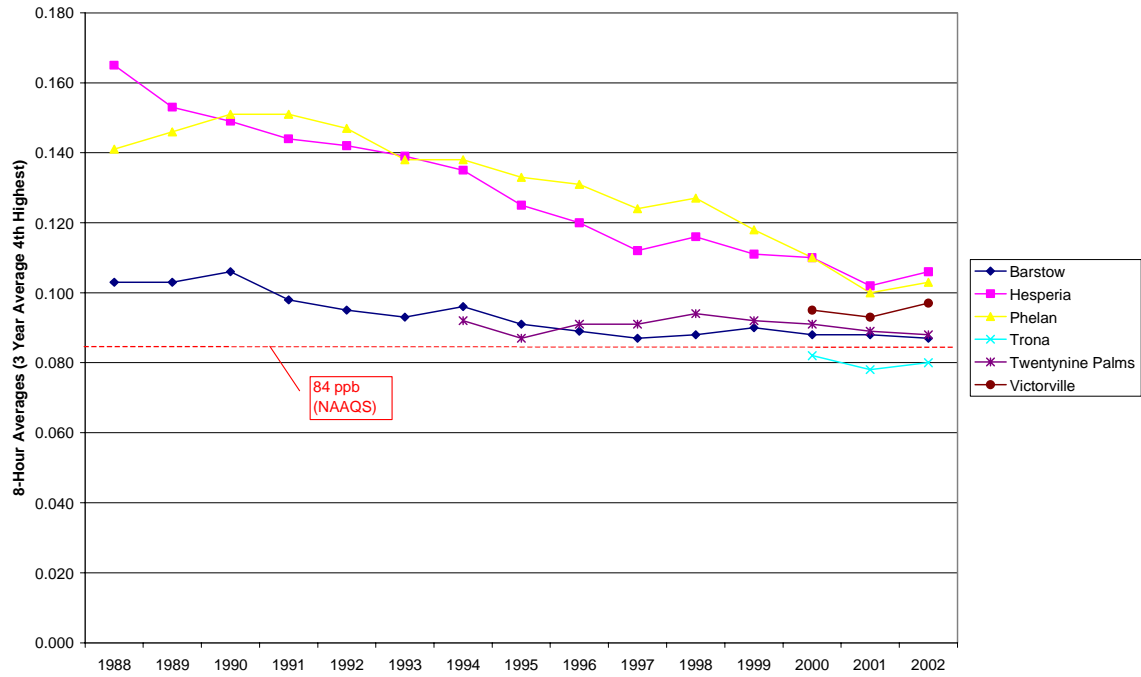
The MDAQMD has experienced a small improvement in its maximum ozone concentration - see Figure 3. Figure 3 also includes lines representing the NAAQS level and the CAAQS level. As is shown in the figure, the MDAQMD is approaching attainment of the one-hour NAAQS. Note that the three stations closest to the South Coast Air Basin (and the source of transported ozone and ozone precursors) have the highest historical ozone concentrations, Phelan, Hesperia and Victorville. The more distant or isolated stations (Barstow, Twentynine Palms and Trona) have much lower concentrations, and are in fact recently experiencing concentrations in attainment of the NAAQS.

Figure 3 - Maximum One-Hour Ozone Concentration Trend



No designations have yet been made for the recently promulgated eight-hour ozone NAAQS. The MDAQMD expects to be designated non-attainment for this standard based on ambient concentrations, presented in Figure 4. Progress towards attainment of the one-hour ozone standards also represents progress towards attainment of the eight-hour standard.

Figure 4 - Maximum Eight-Hour Ozone Concentration Trend



CHAPTER 2 – Emission Inventories

Modeled Emission Inventory

Base Year

Future Years

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Modeled Emission Inventory

Complete documentation of the emission inventory used in the modeled attainment demonstration, and the planning inventory for all milestone years, is available at the following web address:

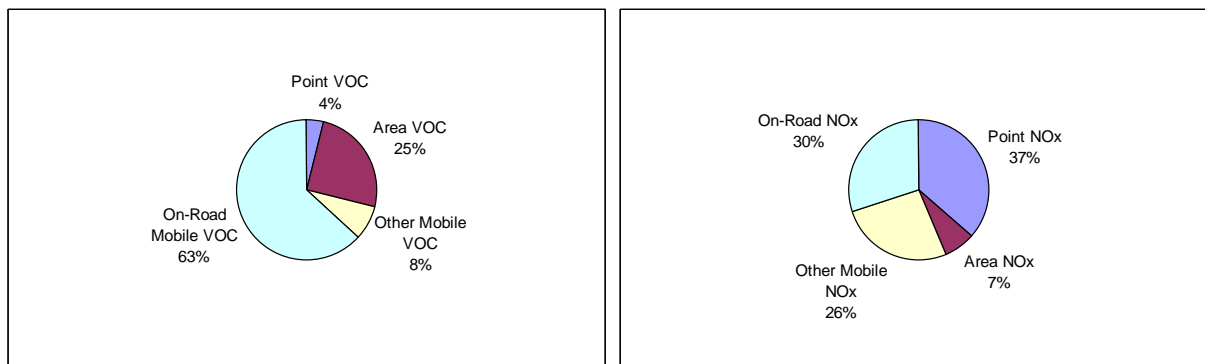
<http://www.arb.ca.gov/app/emsinv/scos/index.php>

(Contact Martin Johnson at mjohnson@arb.ca.gov or (916) 323-3567 if you have questions pertaining to this website)

Federal Ozone Non-Attainment Area Base Year Emission Inventory

The initial Federal base year for emission inventory purposes was 1990. USEPA has since required that 2002 be used as the base year. 1990 is still used for reasonable further progress requirements. This document includes an updated 1990 inventory and a 2002 inventory. 2002 is used as the base year inventory for all growth scenarios in this document. The base year emission inventory is presented in Appendix A. Figure 5 presents the current 1990 base year VOC and NO_x inventory in basic pie chart format (VOC on the left, NO_x on the right). Mobile sources were the primary emitters in the FONA in 1990.

Figure 5 - 1990 Base Year Pie Charts (FONA)



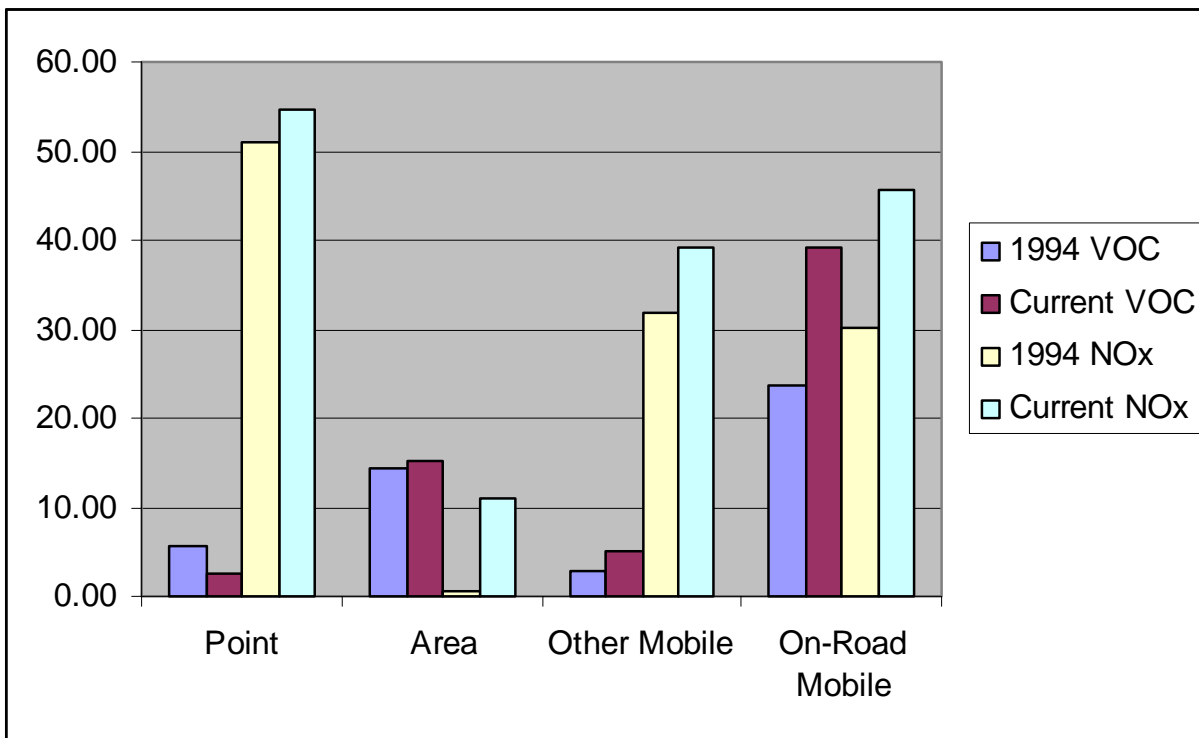
The primary revision to the 1990 base year involves changes to the on-road mobile source emissions inventory - this document includes on-road mobile source emissions calculated using EMFAC2002 version 2.2 with April 2003 activity and other SCAG inputs.² This represents the latest planning assumptions available to the MDAQMD.

Figure 6 compares the 1990 base year as presented in the 1994 Federal plans with the current version. Point source data has been improved, reducing 1990 VOC but increasing NO_x (primarily due to corrections to cement kiln data). Area source and other mobile source emissions calculations have been substantially changed and improved, resulting in significantly

² "Request #441 - Southeast Desert Modified AQMA Ozone SIP Motor Vehicle Inventory," CARB November 5, 2003

increased emissions. The most dramatic change is the increase in on-road mobile emissions due to the use of EMFAC2002 - the increased emissions are considered the most accurate available data.

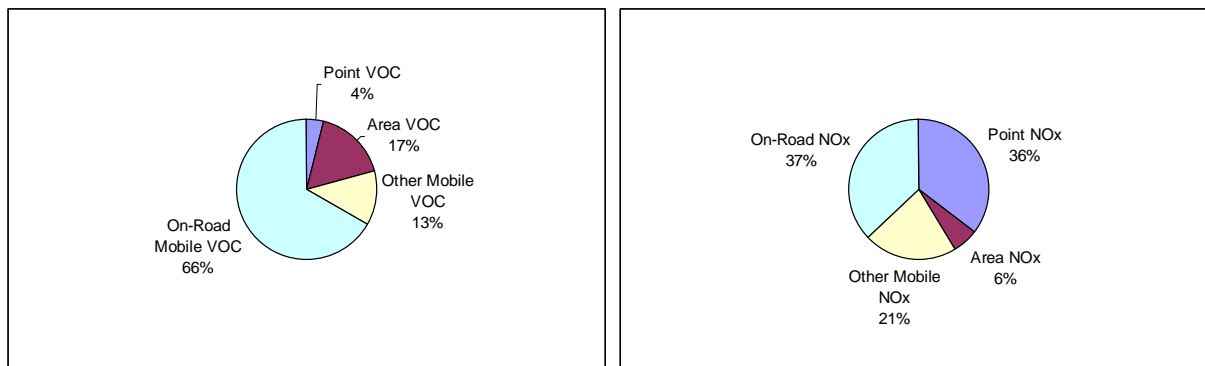
Figure 6 - FONA 1990 Base Year Comparison (1994 version versus Current)



State Ozone Non-Attainment Area Base Year Emission Inventory

The State ozone non-attainment area covers the entire MDAQMD, a much larger area than the FFONA. The larger area includes military bases and mining operations but relatively little additional population. However the State ozone non-attainment area does include significant additional road miles of highway, and as a result the relative contribution of mobile sources is greater, as can be seen in Figure 7.

Figure 7 - 1990 Base Year Pie Charts (State)



Future Year Emission Inventories

Future year or forecasted emission inventories are estimated by multiplying a base year value for each category by a 'growth code' for a given future year. The 'growth code' is indexed to the base year (2002 for this document), so that its value for the base year is 1.00. This allows the growth code to estimate future activity in terms of emissions; if the growth code for the year 2007 is 1.50, activity in that category (and resulting emissions) is expected to be 50 percent greater than in 2002. The MDAQMD uses the growth codes approved by CARB for such purposes (selected point source growth codes have been modified using historical and local data). The growth codes used to forecast point sources are presented in Appendix B. Future year emission inventories are presented for 2005 and 2007 in Appendix B.

In addition to grown emissions, the future year inventories include the MDAQMD Emission Reduction Credit (ERC) bank as emissions. This is because ERCs could be converted into additional (new) emissions at any time. The future year inventories also include a New Source Review (NSR) growth allowance, to specifically account for emissions growth that is below the offset threshold of 25 tons. This NSR growth allowance is equivalent to adding 25 additional tons per year of growth (for both NO_x and VOC) each year.

Figure 8 - Forecasted VOC Emission Inventories (FONA)

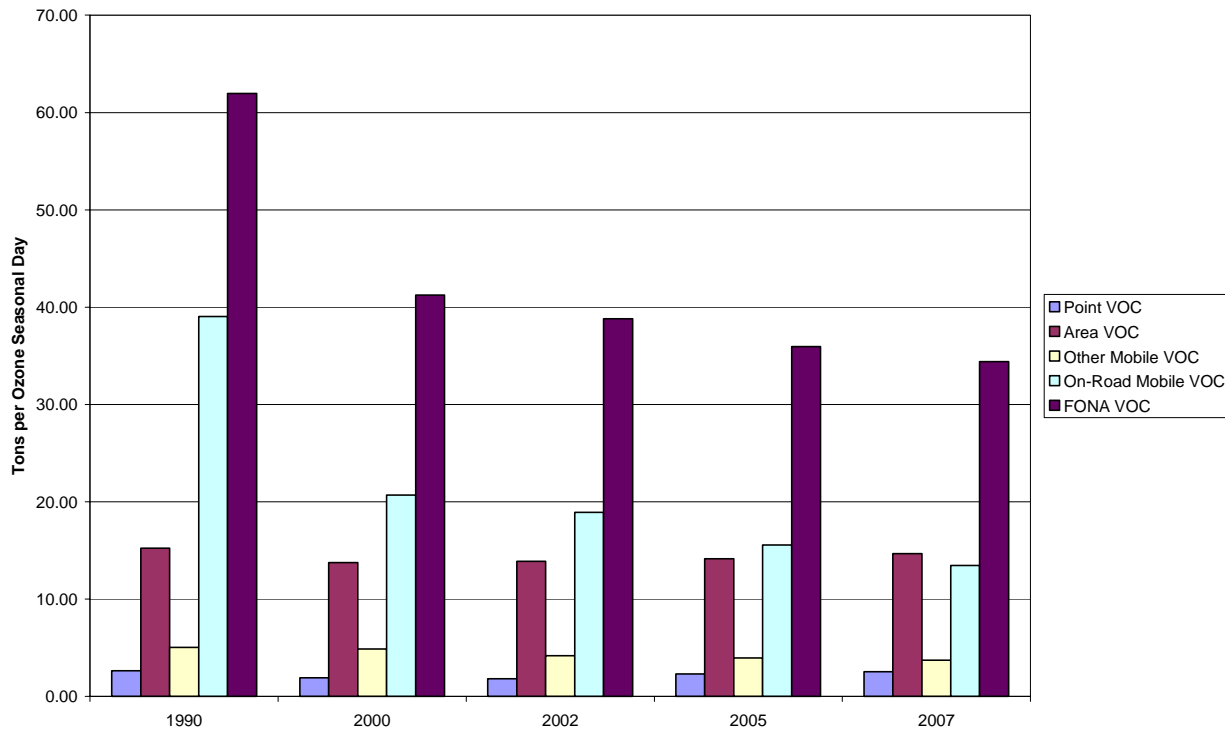


Figure 9 - Forecasted NO_x Emission Inventories (FONA)

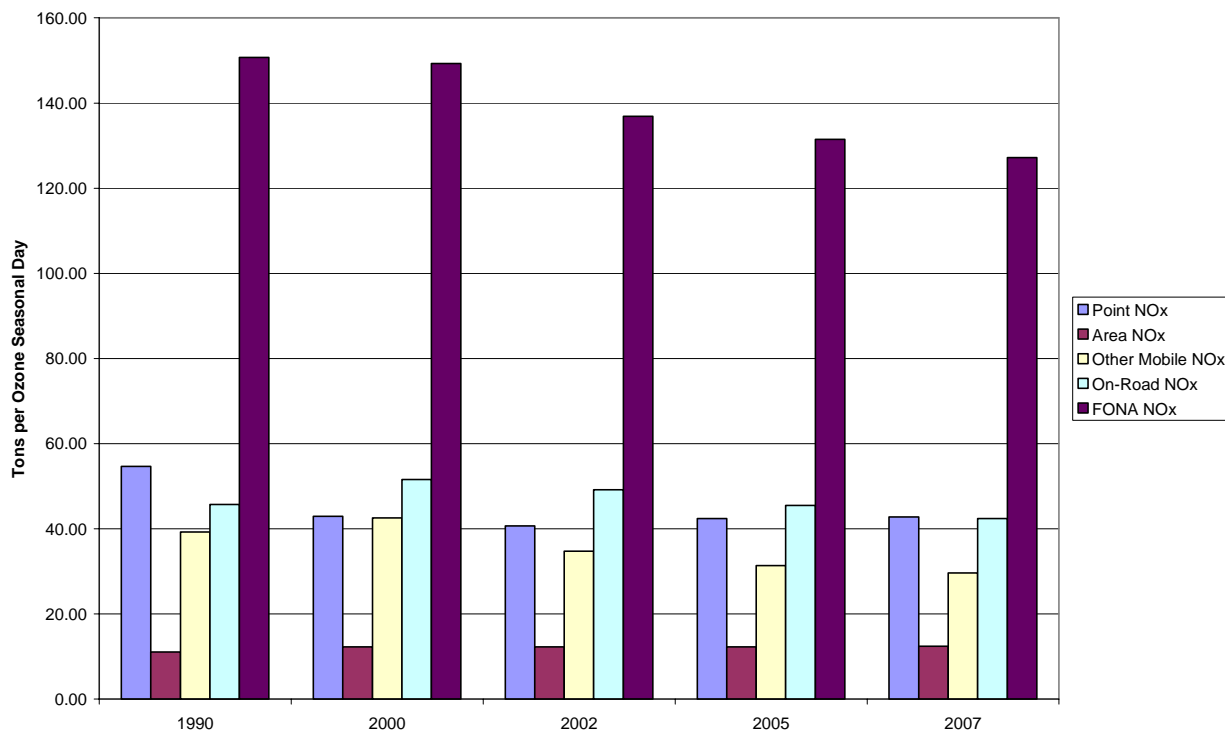


Figure 10 - Forecasted VOC Inventories (State)

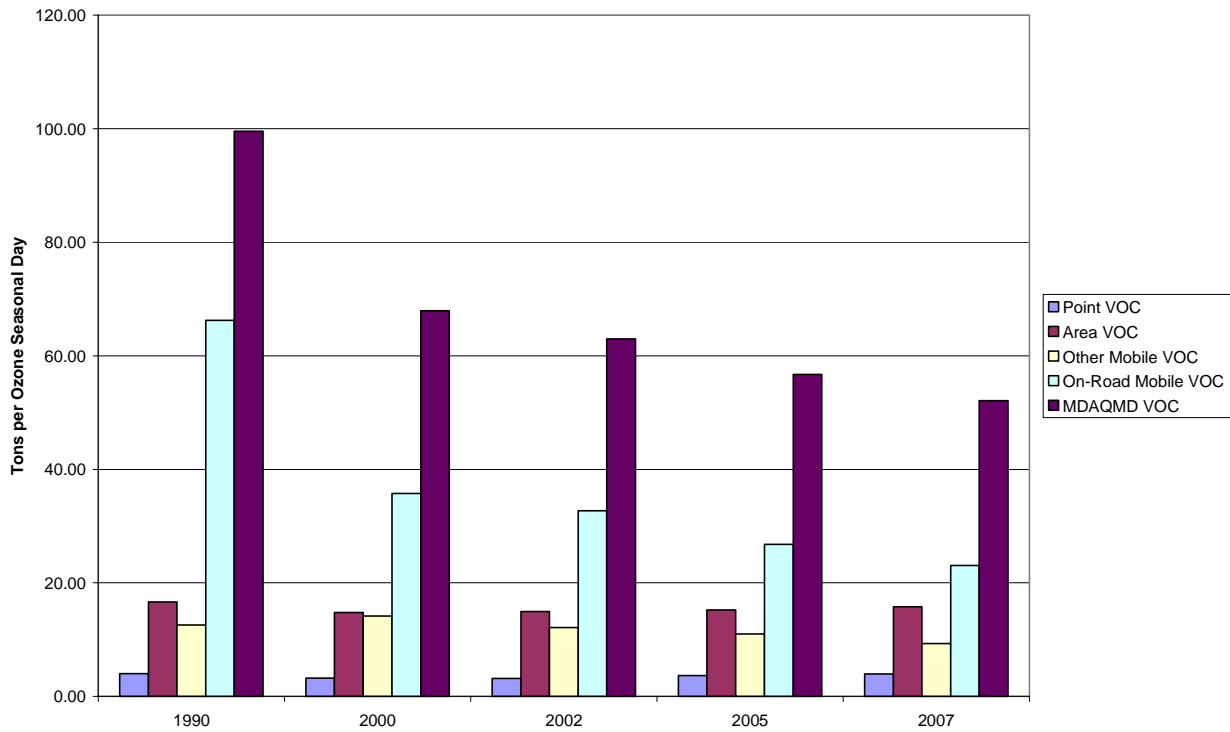
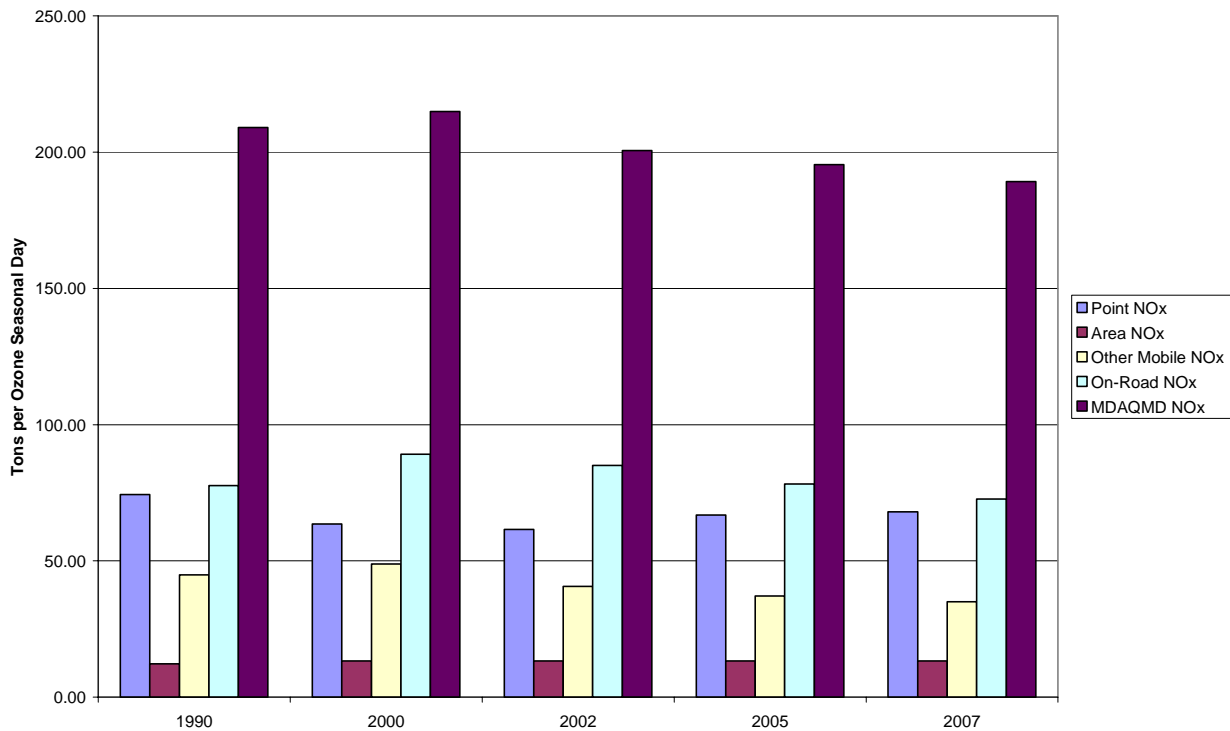


Figure 11 - Forecasted NOx Inventories (State)



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CHAPTER 3 – Control and Contingency Measures

Existing Control Measures

Proposed Control Measures

Rule Adoption Schedule

Contingency Measures

Required Progress

Controlled Emission Inventories

Conformity Budgets

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Existing Control Measures

The current MDAQMD set of rules and regulations represents all feasible control measures for MDAQMD sources. The MDAQMD has in place Reasonably Available Control Technology (RACT) requirements for all applicable sources (including gasoline dispensing vapor control), as well as a New Source Review program with a 25 ton per year major source level and a 1.3:1 offset ratio requirement.

Proposed Control Measures

The MDAQMD is not proposing to adopt any additional control measures. The MDAQMD has in place all applicable RACT rules, and is achieving the CAAQS and NAAQS by the earliest practicable date not as a result of local reductions, but as a result of reductions occurring upwind. The MDAQMD will experience additional future emission reductions resulting from existing and proposed Federal and State control measures affecting mobile and area sources.

Rule Adoption Schedule

The MDAQMD is not proposing the adoption of any new control measures affecting ozone precursor emissions, so a rule adoption schedule is not presented here.

Contingency Measures

The MDAQMD reaffirms the use of the State Enhanced Inspection and Maintenance Program as a contingency measure. The MDAQMD would implement the State's version of Enhanced I&M should a contingency measure be triggered.

Required Progress

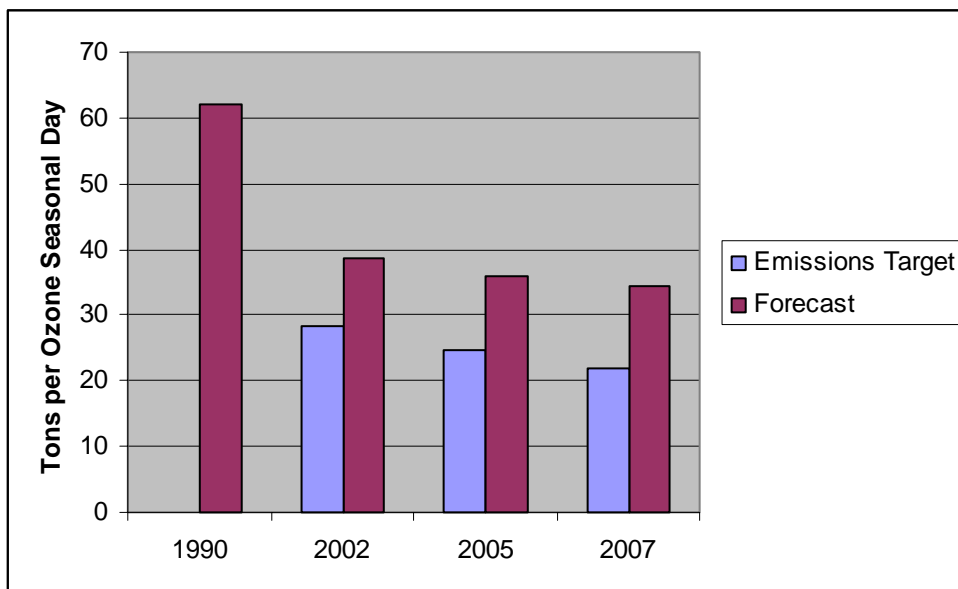
Both State and Federal law specify that the MDAQMD must demonstrate ongoing emission reductions relative to the base year within the FONSA. Federal law requires a three percent (3%) per year reduction in ozone precursors, and does not allow credit to be taken for certain Federal programs. Table 1 presents the base year emissions, the Federal Motor Vehicle Control Program (FMVCP) adjustment and adjusted base year (this adjustment changes from year to year based on the effectiveness of the Federal program), the reasonable further progress required reduction percentage, the calculated emissions target (by year), and the actual emissions forecast.

Table 1 - Federal Reasonable Further Progress

	1990	2002	2005	2007
VOC	61.95	61.95	61.95	61.95
FMVCP Adjustment		-19.52	-20.69	-20.69
Adjusted VOC Baseline		42.43	41.26	41.26
ROP Reduction Target		0.33	0.42	0.48
Emissions Target		28.43	24.61	22.06
Forecast	61.95	39.34	35.95	34.08

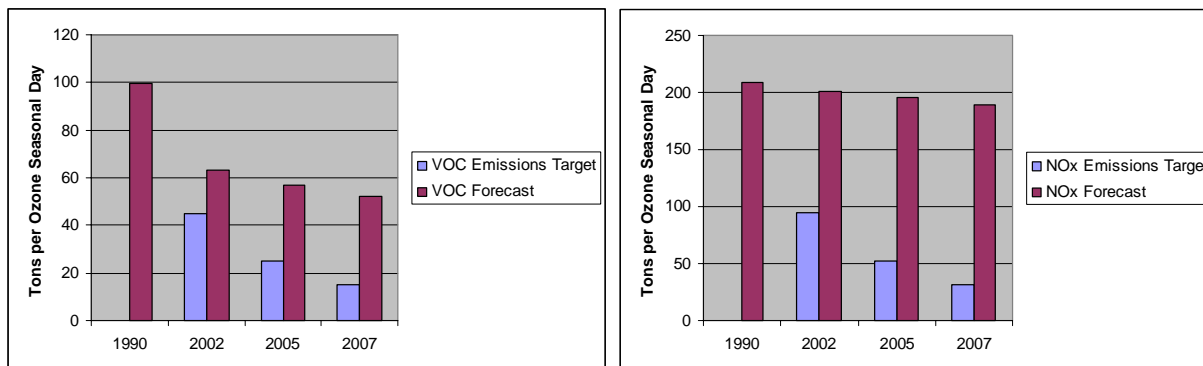
Figure 12 illustrates that the FONA will not meet the required Federal reasonable further progress target levels. The shortfall exceeds ten tons per day by 2007. Note that this shortfall does not represent an inability to meet the NAAQS, as the MDAQMD is demonstrating attainment by 2007 with urban airshed modeling. This shortfall does represent the FONA's dependence on upwind reductions for attainment purposes (or independence of local reductions for attainment purposes).

Figure 12 - Federal Emissions Targets and Forecasts



State law requires a five percent per year reduction in ozone precursors, relative to 1990. This equates to a substantial eighty five percent (85%) reduction requirement by 2007. As is shown in Figure 13, the MDAQMD is not meeting this requirement, although significant reductions have been realized relative to 1990 levels. Meeting these reduction targets would require complete shutdown of all sources under the MDAQMD jurisdiction, and substantial reductions from mobile sources and other sources not under the MDAQMD's jurisdiction, which is not feasible.

Figure 13 - State Emissions Targets and Forecasts



Controlled Emission Inventories

As the MDAQMD is not proposing any additional control measures, the controlled emission inventory is identical to the forecasted emission inventory.

Conformity Budgets

The forecasted emission inventories presented in this document are the emission budgets for general conformity purposes, as no additional control measures are proposed. A project subject to the general conformity test must be demonstrated to conform with the applicable portion of the forecasted emission inventory. For a project that falls between forecasted years, a linearly interpolated inventory may be calculated. For a project that falls after 2007, use 2007.

The forecasted on-road mobile source inventory represents the emission budget for transportation conformity purposes, as no transportation control measures are proposed. A project subject to the transportation conformity test must be demonstrated to conform with the forecasted on-road mobile source inventory. The FONa on-road mobile source inventory is presented below, in addition to the appendices. The portion presented in Table 2 is for information only - the MDAQMD is officially adopting the transportation budget for the entire Southeast Desert Modified AQMA as presented in Appendix C.

Table 2 - Transportation Conformity Budget (Mojave Desert Portion)

	1990	2000	2002	2005	2007
<i>(tons per ozone seasonal day)</i>					
On-Road Mobile Source VOC	39.03	20.68	18.92	15.56	13.46
On-Road Mobile Source NOx	45.71	51.60	49.17	45.47	42.43

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CHAPTER 4 – Attainment Demonstration

Modeling Approach Overview

UAM Overview

Modeling Domain

Model Inputs

Modeling Episodes

Modeling Results

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ATTAINMENT DEMONSTRATION

This chapter paraphrases and reiterates information from the most recent SCAQMD/CARB ozone model runs, the runs performed for the 2003 SCAQMD AQMP. For further information, please refer to Appendix V of that document.³

Modeling Approach Overview

The MDAQMD is a small portion of the complex greater Southern California airshed. The MDAQMD is also only one section of the larger Southeast Desert Modified AQMA ozone non-attainment area. Ozone and ozone precursors are known to flow (or be transported), under the influence of winds, throughout Southern California. The most technically accurate method of evaluating ozone concentrations, ozone emissions, and future ozone behavior is through a large modeling project that includes all of the affected areas in Southern California (and a portion of northern Mexico). The modeling effort has been performed as a joint project by all of the air districts in the region and CARB, with SCAQMD and CARB staff and resources doing the primary work. This regional modeling effort has allowed the most accurate understanding and prediction of future ozone concentrations for Southern California.

UAM Overview

The UAM is the regional modeling system preferred by USEPA and CARB for analyzing ozone non-attainment areas. The UAM predicts future ambient ozone concentrations under historical conditions that led to high ambient ozone concentrations. These conditions are typically multi-day ‘episodes’ in which the State and Federal ozone standards were exceeded. The UAM also evaluates ozone precursor emissions, local and regional meteorology, and regional topography to calculate ozone concentrations. These calculations are performed on an hourly basis throughout the modeled episode, thus allowing the UAM to stimulate changing conditions (i.e. night, day and wind).

Future years are simulated twice using the UAM: first, using the uncontrolled emissions inventory; and second, using a reduced emissions inventory controlled by the proposed ozone control strategy. Comparing the uncontrolled and controlled ambient ozone concentrations identifies the effectiveness of the proposed ozone control strategy. Attainment year ambient ozone concentrations using the reduced emissions inventory controlled by the proposed ozone control strategy should achieve the State and Federal ozone standards.

Modeling Domain

The UAM performed by SCAQMD included the MDAQMD within its model domain. This model domain includes the upwind sources within SCAQMD, which are responsible for the overwhelming ozone transport into the MDAQMD.

³ “Final 2003 Appendix V - Modeling and Attainment Demonstrations,” SCAQMD, August 2003

Model Inputs

SCAQMD performed the UAM attainment demonstration using data maintained by CARB and MDAQMD. The emissions inventory used for the UAM is consistent with the emissions inventory presented in the appendices to this document.

Modeling Episodes

Table 3 presents the two modeling results for the MDAQMD.

Table 3 - 2007 Federal Ozone Attainment Demonstration

Episode Day	All concentrations are in parts per billion	
	SCAB Max 2007 Ozone	Mojave Desert Max 2007 Ozone
August 27, 1987	115	115
August 28, 1987	138	119
August 5, 1997	145	118
August 6, 1997	151	148 (111)*

The August 6, 1997 ozone concentration in the parentheses is the scaled (corrected) value to adjust for the systematic over-prediction in the base year.

Model Results

The modeling results show that the MDAQMD will attain the one-hour ozone NAAQS (124 ppb) in 2007, and will achieve progress in attaining the ozone CAAQS (94 ppb) by that year.

Appendices

A - Base Year Emission Inventory

B - Future Year Emission Inventories and Point Source Growth Codes

C - Southeast Desert Modified AQMA Transportation Conformity Budget

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APPENDIX A - BASE YEAR EMISSION INVENTORY

All emissions are presented in tons per ozone seasonal day for the 2002 base year except where noted

Source	VOC	NO_x
<i>Area Sources</i>		
Manuf and Industrial Combustion - Natural Gas	1.13	1.68
Service and Comm Space Heating - Natural Gas	0.00	0.02
Service and Comm Water Heating - Natural Gas	0.00	0.02
Service and Comm Combustion - Propane	0.04	0.63
Service and Comm Combustion - Diesel	0.32	7.26
Concrete Production	0.00	0.02
Misc Mineral Production	0.40	2.18
Residential Space Heating - Natural Gas	0.01	0.05
Residential Water Heating - Natural Gas	0.00	0.25
Residential Cooking - Natural Gas	0.00	0.06
Residential Combustion - Natural Gas	0.00	0.02
Residential Combustion - Propane	0.00	0.00
Residential Combustion - Wood	0.12	0.06
Landfill Gas	0.15	0.00
Cleaning and Degreasing	1.39	0.00
Petroleum Dispensing	0.61	0.00
Surface Blasting	0.02	0.00
Consumer Products	2.94	0.00
Architectural Coatings	1.43	0.00
Pesticides/Fertilizers	1.09	0.00
Asphalt Paving and Roofing	0.91	0.00
Livestock Waste	3.34	0.00
Structural Fires	0.01	0.00
Tumbleweed Fires	0.18	0.00
Commercial Cooking	0.60	0.00
<i>Total Area Sources:</i>	<i>13.74</i>	<i>12.23</i>
<i>Other Mobile Sources</i>		
Jet Aircraft - Military	0.23	0.29
Locomotives	1.96	37.52
Off-Road Recreational Vehicles	0.76	0.11
Lawn and Garden Equipment	0.56	0.09
Truck Refrigeration Units	0.05	0.21
Mobile Equipment - Commercial	0.16	0.26
Mobile Equipment - Industrial	0.01	0.09
Mobile Equipment - Construction	0.40	3.44
Mobile Equipment - Agricultural	0.07	0.51
Gasoline Can Storage and Handling	0.70	0.00

Total Other Mobile Sources: 4.88 42.53

On-Road Mobile Sources 18.92 49.17

FONA Point Sources (all emissions in tons per year)

			ROG	NOx
Aerochem Inc	Aerospace	El Mirage	0.9	176.7
Lockheed Martin	Aerospace	Helendale	0.3	0.2
SCLA	Aerospace	Victorville	0.0	0.5
		<i>Aerospace Totals:</i>	1.2	177.4
Agcon Inc	Batch Plant	Helendale	0.0	0.0
Blue Diamond Materials	Batch Plant	Victorville	0.0	0.0
Calmat Vulcan	Batch Plant	Oro Grande	2.0	6.3
Cornerstone C&M	Batch Plant	Victorville	0.0	0.0
Dan Copp Crushing	Batch Plant	Barstow	0.0	1.2
Diversified Materials	Batch Plant	Hesperia	0.0	0.0
Diversified Materials	Batch Plant	Lucerne Valley	0.0	0.5
Granite Construction	Batch Plant	Twentynine Palms	0.0	0.0
Hanson Aggregate	Batch Plant	Newberry Springs	25.4	168.4
Hi-Grade Materials	Batch Plant	Hesperia	0.0	0.0
Hi-Grade Materials	Batch Plant	Lucerne Valley	0.9	13.7
Kinne Limestone	Batch Plant	Lucerne Valley	0.2	2.6
Robertson's Readymix	Batch Plant	Adelanto	0.1	0.8
Service Rock Products	Batch Plant	Barstow	0.0	0.0
Sierra Aggregate	Batch Plant	Lucerne Valley	0.6	6.9
		<i>Batch Plant Totals:</i>	29.2	200.4
Cemex Black Mountain Quarry	Cement Manufacturing	Apple Valley	63.3	5383.0
Cemex River Plant	Cement Manufacturing	Victorville	0.0	0.0
Mitsubishi Cement	Cement Manufacturing	Lucerne Valley	17.1	2244.8
TXI Riverside Cement	Cement Manufacturing	Oro Grande	77.4	4186.0
		<i>Cement Manufacturing Totals:</i>	157.8	11813.8
California Cogeneration	Electric Generation	Victorville	0.0	5.5
Daggett Leasing	Electric Generation	Daggett	6.3	13.0
Harper Lake	Electric Generation	Harper Lake	17.5	23.5
Kramer Junction	Electric Generation	Boron	15.3	62.0
Reliant Energy	Electric Generation	Daggett	15.8	909.5
SCE Victorville	Electric Generation	Victorville	0.0	0.4
US West Financing	Electric Generation	Oro Grande	0.7	35.8
		<i>Electric Generation Totals:</i>	55.6	1049.7
Cabo Yachts	Fiberglass	Adelanto	18.9	0.0
Hawaiian Fiberglass	Fiberglass	Adelanto	5.6	0.0
Kormil Industries	Fiberglass	Hesperia	1.8	0.0
May Manufacturing	Fiberglass	Victorville	7.1	0.0
Molded Fiber Glass	Fiberglass	Adelanto	16.1	0.0
Pacific Tank	Fiberglass	Adelanto	4.0	0.0
Rainbow Fiberglass	Fiberglass	Adelanto	18.4	0.0
		<i>Fiberglass Totals:</i>	71.9	0.0
AFG Industries	Glass Manufacturing	Victorville	0.1	578.5

Desert Valley Hospital	Institution	Victorville	0.3	0.7
Hi Desert Medical	Institution	Joshua Tree	0.0	0.7
St. Mary Hospital	Institution	Apple Valley	0.3	4.7
Veterans Home of Barstow	Institution	Barstow	0.1	1.1
Victor Valley Community Hospital	Institution	Victorville	0.1	3.2
Victor Valley Memorial	Institution	Victorville	0.1	0.0
		<i>Institution Totals:</i>	<i>0.9</i>	<i>10.4</i>
AFFTC Edwards	Military	Edwards	0.0	0.1
US Army Dagget Airfield	Military	Daggett	1.1	1.3
USMC Logistics Base Nebo	Military	Barstow	5.4	11.5
USMC Logistics Base Yermo	Military	Barstow	20.2	35.3
USMCAGCC	Military	Twentynine Palms	3.5	17.3
		<i>Military Totals:</i>	<i>30.2</i>	<i>65.5</i>
Brubaker-Mann	Mining	Barstow	0.0	0.0
Calico Rock	Mining	Barstow	0.0	0.0
OMYA	Mining	Lucerne Valley	0.1	1.1
Rheox	Mining	Newberry Springs	0.2	9.1
Specialty Minerals	Mining	Lucerne Valley	0.1	1.5
Victorville Industrial Minerals	Mining	Oro Grande	0.0	0.0
		<i>Mining Totals:</i>	<i>0.4</i>	<i>11.7</i>
Advance Disposal	Misc Coating/Manuf	Hesperia	0.3	0.0
Alrayco	Misc Coating/Manuf	Adelanto	0.0	4.7
Daily Press	Misc Coating/Manuf	Victorville	1.5	0.0
Ennis Paint	Misc Coating/Manuf	Adelanto	0.0	0.0
Fast Tops	Misc Coating/Manuf	Hesperia	15.1	0.0
Induction Technology	Misc Coating/Manuf	Adelanto	0.4	0.0
Jack B. Kelly	Misc Coating/Manuf	Adelanto	0.7	0.0
JPM Product	Misc Coating/Manuf	Hesperia	0.5	0.1
Labelhouse	Misc Coating/Manuf	Adelanto	2.1	0.0
Lead Masters	Misc Coating/Manuf	Hesperia	0.0	0.0
McWelco Products	Misc Coating/Manuf	Hesperia	2.9	0.0
Mobile Pipe Wrap	Misc Coating/Manuf	Adelanto	14.6	0.2
National Arnold Magnetics	Misc Coating/Manuf	Adelanto	13.5	0.8
Northwest Pipe & Casing	Misc Coating/Manuf	Adelanto	11.5	0.0
Sherwin-Williams	Misc Coating/Manuf	Victorville	32.5	0.0
Simtec	Misc Coating/Manuf	Hesperia	0.1	0.0
Spede Tool Mfg	Misc Coating/Manuf	Adelanto	0.9	0.8
Spede Tool Mfg	Misc Coating/Manuf	Adelanto	4.6	0.0
Technique Design	Misc Coating/Manuf	Morongo Valley	0.2	0.0
TPS Technologies	Misc Coating/Manuf	Adelanto	0.2	15.7
World of Leisure	Misc Coating/Manuf	Adelanto	6.9	0.1
		<i>Misc Coating/Manuf Totals:</i>	<i>108.5</i>	<i>22.4</i>
PG&E Hinkley	Natural Gas Transmission	Hinkley	70.1	578.7
SCG Adelanto	Natural Gas Transmission	Adelanto	0.5	32.8
SCG Kelso	Natural Gas Transmission	Kelso	0.5	80.4
SCG Newberry Springs	Natural Gas Transmission	Newberry Springs	3.0	171.5
SCG Victorville	Natural Gas Transmission	Victorville	0.1	0.0
		<i>Natural Gas Transmission Totals:</i>	<i>74.2</i>	<i>863.4</i>

Accent Auto Body	Paint & Body	Hesperia	0.6	0.0
Best Auto Body	Paint & Body	Hesperia	0.1	0.0
Daves Auto Body	Paint & Body	Lenwood	0.1	0.0
Doman Auto Body	Paint & Body	Hesperia	0.2	0.0
Mc Geez Auto Body	Paint & Body	Twentynine Palms	1.4	0.0
Monty's Chevrolet	Paint & Body	Victorville	1.0	0.0
Pacific Paint	Paint & Body	Hesperia	0.2	0.0
Rancho Motors	Paint & Body	Victorville	0.3	0.0
Sonshine Auto Body	Paint & Body	Victorville	1.0	0.0
Sunland Ford	Paint & Body	Victorville	0.2	0.0
Sunset Paint and Body	Paint & Body	Hesperia	1.7	0.0
Yucca Auto Body	Paint & Body	Yucca Valley	1.0	0.0
Yucca Valley Ford	Paint & Body	Yucca Valley	0.3	0.0
	<i>Paint & Body Totals:</i>		<i>8.1</i>	<i>0.0</i>
Beck Oil	Petroleum Pipeline & Terminal	Victorville	0.6	0.0
CalNev Bulk Plant	Petroleum Pipeline & Terminal	Daggett	35.1	0.0
	<i>Petroleum Pipeline & Terminal Totals:</i>		<i>35.7</i>	<i>0.0</i>
Barstow Railyard	Railroad Switching	Barstow	6.4	0.9
City of Barstow	Wastewater/Landfill/Water	Barstow	0.2	37.8
Lenwood Hinkley	Wastewater/Landfill/Water	Hinkley	0.1	0.8
Victor Valley Wastewater Treatment	Wastewater/Landfill/Water	Victorville	0.0	1.5
	<i>Wastewater/Landfill/Water Totals:</i>		<i>0.3</i>	<i>40.1</i>
C&M Wood Industries	Wood Coating	Hesperia	6.9	1.2
Commercial Wood Products	Wood Coating	Adelanto	7.9	0.0
Hacker Wallsystems	Wood Coating	Yucca Valley	0.1	0.0
Inland Panel Coatings	Wood Coating	Adelanto	20.9	0.0
Mueller Turner	Wood Coating	Morongo Valley	1.3	0.0
Terrell Industries	Wood Coating	Hesperia	13.3	0.0
Walnut Valley Finishing	Wood Coating	Adelanto	26.7	1.9
	<i>Wood Coating Totals:</i>		<i>77.1</i>	<i>3.1</i>
FONA		Totals (tpy):	657.6	14837.3
		Totals (tpaad):	1.80	40.65

Total FONA (tons per os day):
VOC
NOx
39.34
144.58

APPENDIX B - FUTURE YEAR EMISSION INVENTORIES AND POINT SOURCE GROWTH CODES

FONA Only:

	1990	2002	2005	2007
Point VOC	2.66	1.80	2.31	2.52
Area VOC	15.23	13.74	13.89	14.16
Other Mobile VOC	5.03	4.88	4.19	3.94
On-Road Mobile VOC	39.03	18.92	15.56	13.46
FONA VOC	61.95	39.34	35.95	34.08
	1990	2002	2005	2007
Point NOx	54.70	40.65	42.37	42.76
Area NOx	11.064	12.234	12.29	12.262
Other Mobile NOx	39.236	42.531	34.757	31.358
On-Road NOx	45.71	49.17	45.47	42.43
FONA NOx	150.71	144.58	134.89	128.81

Total MDAQMD:

	1990	2002	2005	2007
Point VOC	4.02	3.18	3.70	3.93
Area VOC	16.67	14.79	14.93	15.22
Other Mobile VOC	12.58	14.15	12.15	11.02
On-Road Mobile VOC	66.26	32.72	26.78	23.06
MDAQMD VOC	99.535	64.837	57.559	53.234
	1990	2002	2005	2007
Point NOx	74.35	61.59	66.84	68.01
Area NOx	12.22	13.26	13.29	13.26
Other Mobile NOx	44.87	48.93	40.74	37.15
On-Road NOx	77.60	85.02	78.27	72.70
MDAQMD NOx	209.05	208.81	199.14	191.12

FONA Point Sources Grown Years:

Point Category	1990		Base Year 2002		2005		2007	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Aerospace	0.9	136.2	1.2	177.4	1.2	181.8	1.2	177.7
Batch Plants	21.7	148.9	29.2	200.4	30.5	209.0	31.7	217.6
Cement Manufacturing	157.8	11813.8	157.8	11813.8	157.8	11813.8	157.8	11813.8
Electric Generation	85.2	1608.7	55.6	1049.7	72.7	1372.2	75.2	1418.9
Fiberglass	34.0	0.0	71.9	0.0	81.5	0.0	87.3	0.0
Glass Manufacturing	0.1	787.0	0.1	578.5	0.1	578.5	0.1	578.5
Institution	0.7	8.6	0.9	10.4	0.9	10.7	1.0	11.0
Military	47.6	103.2	30.2	65.5	28.5	61.8	28.6	62.0
Mining	0.3	8.7	0.4	11.7	0.4	12.2	0.4	12.7
Misc Coating/Manuf	61.0	12.6	108.5	22.4	124.1	25.6	134.7	27.8
Natural Gas Transmission	455.5	5299.8	74.2	863.4	77.6	903.2	80.6	938.1
Paint & Body	6.6	0.0	8.1	0.0	8.4	0.0	8.5	0.0
Petroleum Pipeline & Terminal	24.4	0.0	35.7	0.0	34.4	0.0	35.1	0.0
Railroad Switching	6.9	1.0	6.4	0.9	6.7	0.9	7.0	1.0
Wastewater/Landfill/Water	0.3	34.4	0.3	40.1	0.3	42.6	0.3	44.4
Wood Coating	66.9	2.7	77.1	3.1	77.1	3.1	79.9	3.2
ERCs	0	0	0	0	64.5	175.8	64.5	175.8
NSR Growth Allowance	0	0	0	0	75	75	125	125
Totals (tons per year):	970	19965	658	14837	842	15466	919	15608
Total (tons per average annual day):	2.66	54.70	1.80	40.65	2.31	42.37	2.52	42.76

MDAQMD Point Sources Grown Years:

Point Category	1990		Base Year 2002		2005		2007	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
Aerospace	3.2	223.7	4.2	291.4	4.3	298.7	4.2	292.0
Batch Plants	21.7	148.9	29.2	200.4	30.5	209.0	31.7	217.6
Cement Manufacturing	157.8	11813.8	157.8	11813.8	157.8	11813.8	157.8	11813.8
Electric Generation	72.0	1737.5	55.8	1346.6	76.0	1834.8	78.6	1897.2
Fiberglass	34.0	0.0	71.9	0.0	81.5	0.0	87.3	0.0
Glass Manufacturing	0.1	787.0	0.1	578.5	0.1	578.5	0.1	578.5
Institutions	2.2	10.1	2.7	12.2	2.8	12.6	2.9	13.0
Military	619.8	1376.9	337.1	749.0	318.0	706.5	319.1	708.9
Mining	42.8	1494.7	57.6	2012.1	60.1	2098.3	62.5	2184.6
Misc Coating/Manuf	61.0	12.6	108.5	22.5	124.1	25.7	134.7	27.9
Natural Gas Transmission	333.0	9480.6	189.3	5388.8	198.0	5636.9	205.7	5855.2
Paint & Body	16.9	0.0	20.7	0.0	21.4	0.0	21.8	0.0
Petroleum Pipeline & Terminal	28.1	13.4	41.1	19.6	39.7	18.9	40.4	19.3
Railroad Switching	6.9	1.0	6.4	0.9	6.7	0.9	7.0	1.0
Wastewater/Landfill/Water	1.3	36.3	1.5	42.4	1.6	45.1	1.7	48.1
Wood Coating	66.9	2.7	77.1	3.1	77.1	3.1	79.9	3.2
ERCs	0	0	0	0	74.2	1037.5	74.2	1037.5
NSR Growth Allowance	0	0	0	0	75	75	125	125
Totals (tons per year):	1468	27139	1161	22481	1349	24395	1435	24823
Total (tons per average annual day):	4.02	74.35	3.18	61.59	3.70	66.84	3.93	68.01

Aerospace	SIC_372&6out	1.176	0.514	0.522	0.535	0.523
	MDAQMD Gen	0.77	0.96	1.00	1.02	1.00
Batch Plant	SIC_14-out	0.052	0.067	0.07	0.073	0.076
		0.74	0.96	1.00	1.04	1.09
Cement Manufacturing	SIC_324-out	0.138	0.163	0.171	0.179	0.184
	MDAQMD Gen	1.00	1.00	1.00	1.00	1.00
Electric Generation	TOTAL_UTIL	39629	42454	67474	69400	71759
	FONA Gen	1.53	1.09	1.00	1.31	1.35
	MDAQMD Gen	1.29	1.05	1.00	1.36	1.41
Fiberglass	SIC_308-out	0.366	0.705	0.775	0.879	0.941
		0.47	0.91	1.00	1.13	1.21
Glass Manufacturing	District Gen	787	593.5	578.5	578.5	578.5
		1.36	1.03	1.00	1.00	1.00
Institution	SIC_806-I20	6.827	8.004	8.283	8.536	8.797
		0.82	0.97	1.00	1.03	1.06
	MDAQMD Data	1377	794.6	749	706.5	709
Military	FED_MIL-out	3.803	2.493	2.414	2.277	2.285
	MDAQMD Gen	1.84	1.06	1.00	0.94	0.95
Mining	SIC_14-out	0.052	0.067	0.07	0.073	0.076
		0.74	0.96	1.00	1.04	1.09
Misc Coating/Manuf	DUR_MFG-out	5.398	8.726	9.609	10.99	11.92
		0.56	0.91	1.00	1.14	1.24
Natural Gas Transmission	SIC_492&3out	0.597	0.521	0.543	0.568	0.59
	FONA Gen	6.14	1.86	1.00	1.05	1.09
	MDAQMD Gen	1.76	1.13	1.00	1.05	1.09
Paint & Body	SIC_752-4out	3.291	3.899	4.024	4.155	4.246
		0.82	0.97	1.00	1.03	1.06
Petroleum Pipeline & Terminal	SIC_46-out	0.039	0.057	0.057	0.055	0.056
		0.68	1.00	1.00	0.96	0.98
Railroad Switching	SIC_40-out	0.091	0.081	0.085	0.089	0.093
		1.07	0.95	1.00	1.05	1.09
Wastewater/Landfill/Water	SIC_494+-out	0.096	0.107	0.112	0.119	0.124
		0.86	0.96	1.00	1.06	1.11
Wood Coating	SIC_393+-out	0.072	0.081	0.083	0.083	0.086
		0.87	0.98	1.00	1.00	1.04

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APPENDIX C - SOUTHEAST DESERT MODIFIED AQMA TRANSPORTATION CONFORMITY BUDGET

This budget is presented in units of tons per summer planning inventory day (or tons per ozone seasonal day)

ROG/VOC	2005	2007
Coachella Valley Portion	4.6	4.1
Antelope Valley Portion	6.3	5.6
Mojave Desert Portion	15.6	13.5
Total SEDAQMA ROG/VOC Budget	26.5	23.2
NO _x	2005	2007
Coachella Valley Portion	12.3	11.1
Antelope Valley Portion	10.5	9.6
Mojave Desert Portion	45.5	42.5
Total SEDAQMA NO_x Budget	68.3	63.2

Note that portions of the Southeast Desert Modified AQMA transportation conformity budget are presented for information only. The total for the AQMA is the budget.